Electroinductive wave propagation in CSRR arrays

M. Beruete[1], M. J. Freire[2], R. Marqués[2], J. D. Baena[2] and M. Sorolla[1]
[1] Electrical and Electronical Department, Public University of Navarre, Campus Arrosadía s/n, E-31006, Pamplona, Navarre, Spain
[2] Departamento de Electrónica y Electromagnetismo, Universidad de Sevilla, Avda. Reina Mercedes s/n, E-41012, Sevilla, Spain

Propagation of waves supported by Complementary Split-Ring Resonators (CSRRs) [1] arrays is reported. Propagation comes as a consequence of the electric coupling between these resonators. Therefore, these waves are termed as electroinductive waves (EIW). They can be Interpreted as the dual counterpart of the so called magnetoinductive waves [2], which are due to the mutual inductance between conventional SRRs. Some simulations have been carried out using *CST Microwave Studio®*, see Fig. 1, and experimental research is in progress.

The reported result opens the way to a high variety of applications in 1-D planar microwave circuits, such as transducers, delay lines, bends, power dividers, couplers, etc. Applications in 2D and 3D technology are also envisaged: probes, lenses, antennas, etc.

[1] F. Falcone, T. Lopetegi, M A G Laso, J D Baena, J Bonache, M Beruete, R Marqués, F Martín and M Sorolla, *Phys. Rev. Lett*., **93**, 197401 (2004)
[2] E. Shamonina, V.A. Kalinin, K. H. Ringhofer, L. Solymar, *Journal of Applied Physics*, **2**, 10 (2002)

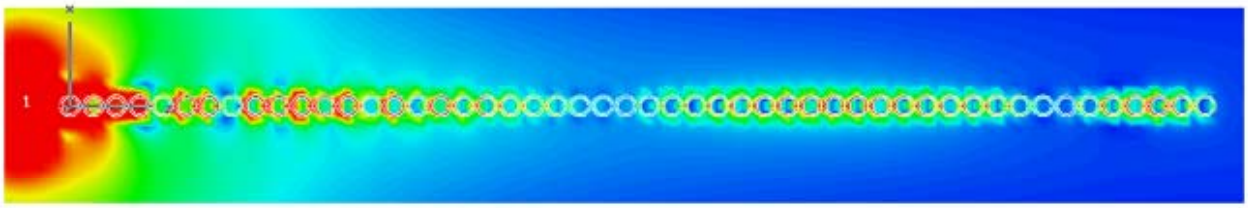

Figure 1 – Surface Current on the surface containing the CSRRs. The source is located on the left